BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
The Establishment of Policies and Service Rules	)	IB Docket No. 02-19
For the Non-Geostationary Satellite Orbit	)	
Fixed-Satellite Service in the Ka-Band	)	

To: The Commission

REPLY COMMENTS OF TRW Inc.

TRW Inc. ("TRW"), by its attorneys and pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415 and 1.419, hereby replies to the initial comments filed on April 3, 2002 in the above-captioned proceeding.[1] Based on the overall content of the comments submitted, it appears evident that the most suitable approach to spectrum sharing among multiple Ka-Band nongeostationary fixed-satellite service ("NGSO FSS") systems is the allotment of the full bands to each licensee subject to a requirement to avoid in-line interference events.

In its Comments, TRW offered its own variation on the avoidance of in-line events option outlined in the *NPRM*. This approach would provide for each system to be licensed throughout the full Ka-band NGSO FSS spectrum, with frequency isolation employed as a means of spectrum sharing where in-line interference cannot otherwise be mitigated through system coordination and/or design. TRW also observed that the Commission should establish standard system parameters that applicants must identify

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[1] *See The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed-Satellite Service in the Ka-Band*, 17 FCC Rcd 2807 (2002) ("*NPRM*").

and share as a means of facilitating inter-system coordination. TRW urges the Commission to proceed expeditiously to award licenses based on this hybrid approach.

I. A Majority of the Commenting Parties Support Some Means of Avoidance of In-Line Interference Events as a Default Sharing Mechanism, And This Approach Should Be Adopted.

Although there is no consensus among all affected parties concerning the appropriate mechanism for sharing of the primary Ka-band NGSO FSS spectrum (at 28.6-29.1 GHz and 18.8-19.3 GHz), a clear majority of the parties filing comments in response to the *NPRM* support some variation on an avoidance of in-line events regime.[2] TRW agrees, for example, with Teledesic's assertion that the use of frequency isolation to address the relatively infrequent events during which interference-inducing alignment occurs "is obviously preferable to any arrangement that requires band segmentation as the default arrangement 100% of the time."[3] During all times when systems are not in interfering alignment, each system will be able to use the entire allocated band, maximizing spectrum efficiency.

TRW disagrees with those who assert incorrectly that adoption of the in-line interference avoidance approach would constitute favoring a specific technical approach.[4] In fact, there are a sufficient number of different potential means for effecting in-line interference avoidance (satellite diversity, frequency isolation, system harmonization) that selection of this mechanism would not place undue technical

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[2] *See* SkyBridge Comments at 11-13; Teledesic Comments at 11-12; TRW Comments at 3-8.

[3] Teledesic Comments at 11. TRW, however, admonishes that satellite diversity, which is also cited by Teledesic, is a useful tool only for those systems that have the inherent capability to employ the interference mitigation technique within their system design concepts. It should not be viewed as universally applicable, and would be completely impracticable for systems that do not rely on dual or triple coverage within their system designs.

[4] *See* @Contact Comments at 14.

limitations on any party.[5] This same menu of options also ensures that operators need not be saddled with significant increases in system complexity or operational limitations as a means of sharing spectrum.

II. Although There Are Benefits To The Adoption Of Standardized Constellation Parameters, The Commission Is Not In A Position To Mandate The Adoption of Homogeneous Constellations for the Ka-Band NGSO FSS.

Hughes is the lone commenter offering full support for the adoption of homogeneous constellations for the Ka-Band NGSO FSS.[6] While recognizing the substantial benefits of standardization, all of the other commenters reject a mandatory homogeneous design approach as unworkable in the circumstances before the Commission in this proceeding.[7]

As a general concept, homogeneity among networks is an excellent solution to intersystem spectrum sharing that provides many benefits. There is no question that the deployment of MEO constellations with harmonized characteristics in the Ka-Band could greatly facilitate coordination and efficient use of the spectrum – *e.g.,* by reducing the number of in-line interference events. Regrettably, however, there is no sound basis in this instance for the Commission to impose a standardized design approach on the Ka-band applicants, and its adoption here could substantially delay the implementation of Ka-band NGSO FSS systems.

There is presently a variety of distinct MEO and LEO systems proposed, and there is no practicable basis upon which the Commission could reasonably conclude

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5 *See* SkyBridge Comments at 12.

6 *See* Hughes Comments at 7-11.

7 *See* @Contact Comments at 17-18; SkyBridge Comments at 9-11; Teledesic Comments at 13-14; TRW Comments at 13-14.

that any one of these approaches constitutes a superior technical solution, justifying rejection of all of the others as a matter of public policy. There is, for example, no reason to believe that selection of one MEO design over all others would lead to substantially greater opportunities for provision of service. Instead, each of the differing MEO architectures simply represents the reasoned judgment of a particular company with respect to the optimal technological approach to carry out its business plan.

Given these circumstances, the Commission should not intervene to select one technological solution over another. As TRW urged in its initial Comments, however, the Commission should adopt a policy to encourage the optimization of Ka-band NGSO constellations with the expectation that this impetus, alongside marketplace incentives, would foster some degree of post-licensing standardization.

Instead of adopting an agency-imposed model, the Commission should look toward implementing the modified in-line avoidance approach to spectrum sharing that TRW has proposed, thereby mandating that licensees coordinate their operations to maximize spectrum efficiency and system capacity. TRW believes that a significant and beneficial amount of harmonization among currently-proposed constellation will occur due to the technical and market realities facing each of the operators proposing NGSO FSS networks.

III. Band Segmentation Does Not Provide The Benefits That @Contact Claims.

Hard band segmentation is strongly disfavored by all of the other commenting parties with the exception of @Contact.[8] TRW believes that @Contact has

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[8] *See* Hughes Comments at 3-5; SkyBridge Comments at 5-8; Teledesic Comments at 5-11; TRW Comments at 8-12.

erred in concluding that hard band segmentation would promote the particular benefits it identifies as resulting from this approach: (1) promoting a market-based solution to spectrum sharing, (2) preventing spectrum warehousing, (3) encouraging spectrum efficient sharing, and (4) allowing the expeditious issuance of licenses. In fact, hard band segmentation is fundamentally the antithesis of sharing, as it divides the available spectrum into little blocks that both are not to be shared between systems, and that are too small to support the envisioned operations. TRW's hybrid approach incorporates band segmentation in a more beneficial manner, when it is actually needed to avoid harmful interference.

As TRW and several other commenters have pointed out, one potential marketplace impact of resorting to band segmentation might be the failure of any system to attract adequate financing as a result of assignment of spectrum in blocks too small to provide viable service. Operators will not have any beneficial coordination flexibility if the core amount of spectrum they have been assigned is insufficient to operate their systems.[9] The certainty provided by the assignment of spectrum that is inadequate for the licensees needs could thus be the certainty of failure to attract necessary investment. Moreover, licensing of all spectrum to each licensee, subject to coordination, will facilitate the ability to share spectrum with any non-U.S. satellite systems that may be implemented.

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[9] *See* Hughes Comments at 3 ("guaranteed access to only 83.3 MHz of paired spectrum suitable for communications with ubiquitous earth terminals . . . is insufficient – both technically and economically – to support any multi-billion-dollar advanced technology system designed to deliver broadband capability"); SkyBridge Comments at 6; TRW Comments at 10-11.

While @Contact lauds the simplicity of a 1/*n* division of spectrum as a means of providing spectrum to all,[10] TRW maintains that this approach is inherently "anti-Solomonic." Under this approach, it would be necessary as a practical matter for each operator to coordinate sharing in other bands in order actually to provide service. It is well-recognized that some level of coordinated spectrum use is essential for NGSO FSS systems to operate in the Ka-band unless only one system is built – *i.e.,* the absolute necessity to effect sharing with other spectrum users cannot be avoided through segmentation. Indeed, as @Contact itself notes, the limitations of the "primary" spectrum available on this basis would "provide the necessary impetus for parties to develop coordination agreements."[11] Thus, in a multiple-system environment, hard band segmentation provides no advantages other than regulatory certainty – and that "certainty" is itself unacceptable. TRW believes that a more constructive impetus to sharing can be provided by the adoption of in-line interference avoidance requirements as a basis for coordination, and assignment to each licensee of the full bands available for NGSO FSS.

Nor does segmentation provide the anti-warehousing benefits that are claimed by @Contact.[12] A non-performing licensee with only an undifferentiated right to share the full Ka-Band spectrum available to NGSO FSS has no particular ability to disrupt sharing agreements among other applicants in the absence of progress toward construction. However, even a potential claim on primary access to a significant portion of the available bandwidth could provide a non-performing licensee with leverage over

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10 *See* @Contact Comments at 8.

11 @Contact Comments at 11.

12 *See* @Contact Comments at 10.

licensees seeking to finalize system designs making use of the entire band. With full-band licensing, no entity can hold a portion of the band hostage.

Finally, as alluded to above, because all parties recognize that coordination is essential to operation in a multi-system environment, segmentation offers no advantage with respect to expeditious licensing. Licenses can be assigned quickly based on the conclusion that it is feasible to share spectrum among *n* systems. Resolution of coordination arrangements among the parties is not a prerequisite to licensing, as @Contact contends.[13] The Commission need establish only a few baseline parameters and a requirement to avoid interference during system alignments in order to proceed with licensing and establish the appropriate regulatory regime. Although this approach, as nuanced by TRW, requires a somewhat more proactive role by the Commission – especially to determine the type(s) of characteristics that would facilitate sharing and to pursue the new policy favoring homogenization that TRW advocates – the rewards in terms of certainty and spectrum efficiency are well worth the time spent to make such basic decisions.

IV. Teledesic's Repeated Claims to "Coordination Priority" Are Without Merit.

Teledesic once again devotes a considerable portion of its pleading to its effort to assert "coordination priority" over second-round Ka-Band NGSO FSS applicants.[14] This claim is unjustified in light of Teledesic's multiple major redesigns of its system, which have left it no closer to implementation of a Ka-Band network than the second round applicants, who initially sought licenses shortly after Teledesic's original

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[13] *See* @Contact at 12-13.

[14] *See* Teledesic Comments at 2, 4, 6-7, 9-10, 12-13 & 15-18.

license was granted. TRW and other commenters have laid to rest Teledesic's claims in the initial comments filed in this proceeding,[15] as well as in the proceeding concerning the most recent Teledesic license modification application.[16] There is no need to repeat this discussion at length here. The Commission has already made clear that the type of "back to the drawing board" modification that Teledesic filed two months ago would be grounds to treat it on equal footing with the other applicants now before the Commission.[17]

V. Other Issues

A. Financial Requirements

All of the commenters addressing the issue support the Commission's threshold conclusion that application of financial qualification requirements should not be necessary because the Commission should be able to issue licenses to all second round Ka-Band NGSO FSS applicants.[18] The commenters also agree that, were it necessary to evaluate applicants' financial qualifications, there would be nothing to be gained from changing the current standard to require a more definitive representation that specific funds have been allocated for system construction.[19] TRW agrees in particular with Hughes' argument that a new requirement that each applicant demonstrate availability of

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[15] *See* @Contact Comments at 4-7; Hughes Comments at 11-17; SkyBridge Comments at 3-4 n.13; TRW Comments at 2-3.

[16] *See* Hughes Comments, FCC File No. SAT-MOD-20020201-00011, at 3-5; TRW Comments, FCC File No. SAT-MOD-20020201-00011, at 4-6; @Contact Opposition, FCC File No. SAT-MOD-20020201-00011, at 18-22.

[17] *See Teledesic LLC*, 17 FCC Rcd 2489, 2492 (¶ 9)(2002).

[18] *See* @Contact Comments at 19; Hughes Comments at 24; SkyBridge Comments at 18; TRW Comments at 14.

[19] *See* Hughes Comments at 17-24; SkyBridge Comments at 19; Teledesic Comments at 24-25; TRW Comments at 15-16.

"previously uncommitted funds" as a means of demonstrating financial qualification is unnecessary, unrealistic and unworkable.[20] Accordingly, this contingent proposal should not be adopted.

B. Milestone Requirements.

The Commission should also decline to adopt its proposal to impose more detailed interim milestone requirements on Ku-band NGSO licensees.[21] Milestones will function best if they are straightforward and self-effectuating with only minimal need for FCC oversight.

TRW also urges the Commission not to adopt the notion that the final, system operational milestone be tied directly to the International Telecommunication Union's "bringing into use" ("BIU") date.[22] Licensees should not be constrained to tighter milestones than those licensed in other proceedings in order to tie the "system operational" milestone to the ITU BIU date – particularly where lengthy regulatory proceedings have been largely responsible for the fact that licensing will occur with just a few years left until expiration of the ITU dates.[23] While there are strong incentives for operators to adhere strictly to the ITU requirements because of the potential coordination benefits, there is no need for the Commission to tie its own licensing requirements to the BIU benchmark. Particularly given the fact that all ITU filings are made at the behest of

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20 *See* Hughes Comments at 17-24. *See also* TRW Comments at 15-16.

21 *See* Hughes Comment at 28-31.

22 *See* @Contact Comments at 20; SkyBridge Comments at 19-20.

23 *See* Hughes Comments at 28 ("There is no reason that . . . existing rules should not apply to secon-round KA-band NGSO FSS applicants just as they already apply to Teledesic; certainly, there is no apparent reason to modify the existing rules to apply *additional* requirements only to second-round applicants"); Teledesic Comments at 26 ("second round licensees should be governed by the same milestones that were imposed on Teledesic, considering of course the different dates of the license grants").

U.S. applicants and licensees, these entities should be permitted to make their own continuing assessments with respect to the impact of the ITU's BIU deadlines upon their future coordination obligations and business plans. Indeed, the Commission should be prepared to file new ITU requests at the option of licensees in support of these reasonable business judgments. This approach is consistent with the Commission's own determination that the marketplace, and not regulatory mandates, should dictate the development of service.[24]

VI. Conclusion

TRW urges the Commission to move expeditiously to adopt service rules and policies for the licensing of second round Ka-band NGSO FSS systems consistent with the views outlined herein and in its initial comments, filed April 3, 2002. Specifically, the Commission should license all qualified applicants to operate over all available Ka-Band NGSO FSS spectrum, and require each to coordinate its use of this spectrum through a combination of system standardization, frequency isolation and, if applicable, satellite diversity.

Respectfully submitted,

TRW Inc.

By: /s/ David S. Keir
Norman P. Leventhal
Stephen D. Baruch
David S. Keir

Leventhal, Senter & Lerman PLLC
2000 K Street, N.W.
Suite 600
Washington, D.C. 20006

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[24] *See NPRM*, FCC 02-30, at 1 (¶ 2).

(202) 429-8970

April 18, 2002 Its Attorneys

CERTIFICATE OF SERVICE

I, Rochelle D. Johnson, do hereby certify that on this 18th day of April, 2002, I sent by U.S. first-class, postage prepaid mail, a copy of the foregoing Reply Comments of TRW Inc. to the following:

Mark A. Grannis
Kelly S. McGinn
Harris, Wiltshire & Grannis, LLP
1200 18th Street, N.W.
Washington, D.C. 20036
Counsel to Teledesic LLC

Todd M. Stansbury
Jennifer D. Hindin
Rebekah Goodheart
Wiley Rein & Fielding
1776 K Street, N.W.
Washington, D.C. 20006
Counsel to @Contact LLC

Gary M. Epstein
John P. Janka
Olivier Strauch
Latham & Watkins
555 Eleventh Street, N.W.
Suite 1000
Washington, D.C. 20004-1304
Counsel to Hughes Communications, Inc.

Tom Tycz*
International Bureau – Room 6-A665
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Jeffrey H. Olson
Diane Gaylor
Paul Weiss Rifkind Wharton & Garrison
1615 L Street, N.W., Suite 1300
Washington, D.C. 20036-5694
Counel to SkyBridge LLC

Alyssa Roberts*
International Bureau – Room 6-B451
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Jennifer Gilsenan*
International Bureau – Room 6-A520
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

*** By Hand Delivery**

/s/ Rochelle D. Johnson
Rochelle D. Johnson